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Generic Excluded Middle

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Abstract

There is a standard quantificational view of generic sentences according to which they have a tripartite logical form involving a phonologically null generic operator called 'Gen'. Recently, a number of theorists have questioned the standard view and revived a competing proposal according to which generics involve the predication of properties to kinds. This paper offers a novel argument against the kind-predication approach on the basis of the invalidity of Generic Excluded Middle, a principle according to which any sentence of the form ⌜Either Fs are G or Fs are not G⌝ is true. I argue that the kind-predication approach erroneously predicts that GEM is valid, and that it can only avoid this conclusion by either collapsing into a form of the quantificational analysis or otherwise garnering unpalatable metaphysical commitments. I also show that, while the quantificational approach does not validate GEM as a matter of logical form, the principle may be validated on certain semantic analyses of the generic operator, and so, such theories should be rejected.

1. Introduction

There is a standard view of characterising sentences (or *generics*, for short), such as those in (1), according to which their logical form is essentially quantificational.[1,2]

(1) a. Ravens are black.

1. See, for example, Krifka et al. (1995); Pelletier and Asher (1997); Mari et al. (2013).
2. This paper focuses mainly on bare plural generics of the form ⌜Fs are G⌝, and sets aside generics involving definite and indefinite determiners like ⌜The F is G⌝ and ⌜An F is G⌝. The meanings of these sentences differ from bare plural generics in subtle ways that put them beyond the scope of this paper.

b. A duck lays eggs.
c. The tiger has stripes.
d. This kind of animal has a mane. [Uttered while pointing at a lion.]

It is well-known that such sentences manage to express generic generalisations about groups of particular events, facts, or individuals without the presence of an overt or articulated quantifier or operator appearing to be responsible for expressing this content. For example, (1a) expresses a generalisation about ravens similar, say, to that which is expressed by *Ravens are generally black*, even though it does not contain an explicit quantificational adverb, like *generally*. And the lack of a dedicated, phonologically articulated generic operator is no quirk of English either: no known language has such a generic operator (cf. Krifka et al., 1995; Dayal, 1999).

Nevertheless, proponents of the standard quantificational view argue that, despite appearances, generics are essentially quantificational. That is, despite the lack of any overt or pronounced elements that are responsible for their general content, generics have a tripartite logical form involving a quantifier, a restrictor clause, and a matrix clause, akin to explicitly quantificational sentences like *Ravens are generally black*. To bridge the theoretical gap between generics and sentences containing overt quantifiers, theorists posit a covert, unpronounced generic operator, which they call 'Gen', and they argue it is responsible for the general content of generics. While theorists disagree about how to semantically analyse *Gen*, most theorists agree that *Gen* is covertly present in the logical form of generics.

However, a number of theorists have recently argued against the standard approach and revived a competing proposal (Liebesman, 2011; Liebesman and Magidor, 2017, 2023; Teichman, 2023).[3] According to this proposal, generics are akin to sentences which genuinely express kind-level predications, such as those in (2), and do not involve quantification or covert material in their logical form.

(2) a. Dodos are extinct.
b. Potatoes were cultivated in South America.

These theorists argue that, not only does the kind-predication view provide a unified semantic analysis for characterising sentences and genuinely kind-predicational sentences like those in (2), it better explains complex copredications, like *Mosquitos are widespread and irritating*, as well as the fact that no known language has a dedicated, phonologically articulated generic operator. Consequently, this view has received a lot of attention and its challenge must be taken seriously by proponents of the standard view.

Determining whether the kind-predication approach or the quantificational approach is correct is a delicate task. In this paper, I will attempt to adjudicate between these theories by considering the following principle concerning generics:

Generic Excluded Middle (GEM): For any bare plural characterising sentence of the schematic form ⌜Fs are G⌝, the sentence ⌜Either Fs are G or Fs are not G⌝ is true.

Investigating whether GEM is valid is a useful tool for evaluating theories of generics more generally, since it provides a simple, yet overlooked, test for whether a theory of generics is empirically adequate. For if GEM is invalid, it follows that any semantic analysis that validates GEM is empirically inadequate. Conversely, if GEM is valid, any semantic analysis that invalidates GEM is empirically inadequate.

3. For historical proponents of the kind-predication view, see Lawler (1972); Dahl (1975); Carlson (1977a,b). For critical discussion of this view, see Krifka et al. (1995); Leslie (2015). For more general discussion of the relationship between generics and the metaphysics of kinds, see Liebesman and Sterken (2021).

In this paper, I will argue that GEM is invalid and I will present a novel argument against the kind-predication approach on the grounds that it erroneously predicts that GEM is valid. Ultimately, I think that the kind-predication approach can avoid validating GEM, but only by either endorsing quantificational structure or committing itself to unpalatable metaphysical consequences. Conversely, I will also argue in favour of the standard quantificational approach to generics on the grounds that it has the resources to predict the invalidity of GEM, although this is by no means guaranteed. In particular, I show that certain semantic analyses of the generic operator *Gen* have the unfortunate consequence of entailing GEM, and so, they should be rejected.

The paper is structured as follows. Section 2 outlines the logical forms that the kind-predication and quantificational approaches posit for generic sentences. Section 3 introduces Generic Excluded Middle and argues that it is invalid. It then draws out some consequences of the invalidity of GEM for the two approaches. Section 4 argues that, to capture the invalidity of GEM, the kind-predication approach must either collapse into a form of the quantificational approach or else garner unpalatable metaphysical commitments. Section 5 considers what additional assumptions are needed for quantificational accounts of generics to validate GEM by considering a number of specific semantic analyses. Section 6 concludes.

2. Generics and Quantificational Structure

Let us begin by carefully distinguishing the logical forms that the quantificational approach and the kind-predication approach postulate for generics. According to the quantificational approach, the logical form of generic sentences is a tripartite quantificational structure consisting of a phonologically null quantifier called 'Gen'. The generic operator *Gen* is usually analysed as an adverb of quantification in the style of Lewis (1975).[4] More specifically, the *Gen* operator relates two open sentences called the restrictor clause and the matrix clause. The matrix clause makes the main assertion of the generic sentence, specifying the property attributed to the relevant members of the domain of quantification. The restrictor clause states the restricting cases relevant to the matrix. The *Gen* operator unselectively binds over any free variables in its scope, whether they be individuals, situations, worlds, or events. The variables it binds depends on the particular analysis in question. Consequently, the general logical form of generics will be given as in the following schema:

(3) $\text{Gen}\ x_1, \ldots, x_i[\textbf{Restrictor}(x_1, \ldots, x_i)][\exists y_1, \ldots, y_j\ \textbf{Matrix}(\{x_1\}, \ldots, \{x_i\}, y_1, \ldots, y_j)]$

where $x_1, \ldots, x_i$ are the variables to be bound by *Gen*, $y_1, \ldots, y_i$ are the variables to be bound existentially with scope just in the Matrix, $\phi[\ldots x_m \ldots]$ is a formula where x_m occurs free, and $\phi[\ldots \{x_m\} \ldots]$ is a formula where x_m possibly occurs free. For perspicuity, I will sometimes write $\ulcorner\text{Gen}[\phi][\psi]\urcorner$ as shorthand, where 'ϕ' and 'ψ' are the restrictor and matrix material respectively.

While we have not yet provided a semantic interpretation for the above notation, nor tied it directly to the syntax, this schema provides us with a useful means to represent various readings of characterising sentences. Indeed, a compelling piece of linguistic evidence in support of the quantificational analysis comes from Carlson's observation that some sentences appear to have more than one generic interpretation (Carlson, 1989). For example, there are two salient generic interpreta-

4. See, e.g., Krifka et al. (1995, 25ff.) and Mari et al. (2013). There is also a situation-based approach to quantificational adverbs, pioneered by Berman (1987) and adopted by von Fintel (2004a); Heim (1990); Elbourne (2005, 2013), which I myself favour for generics (Kirkpatrick, 2023), but since the unselective binding approach is more familiar in the literature, it will be more convenient to work with it. There is also an approach that treats *Gen* as a quantificational determiner; see Pelletier and Asher (1997). These differences won't matter when considering the central tenets of the quantificational approach.

tions of the sentence in (4), which may be represented as follows:

(4) Typhoons arise in this part of the Pacific.

a. Typhoons in general have a common origin in this part of the Pacific
$\text{Gen } x; y[\text{typhoons}(x)][y = \text{this.part.of.the.Pacific} \wedge \text{arise.in}(x, y)]$

b. There arise typhoons in this part of the Pacific
$\text{Gen } x[x = \text{this.part.of.the.Pacific}][\exists y(\text{typhoons}(y) \wedge \text{arise.in}(y, x))]$

The ambiguity in (4) is evidence for the quantificational approach because quantified sentences often exhibit the same type of ambiguity. Moreover, the quantificational approach can accommodate the two readings of (4) by partitioning the surface material into the restrictor and matrix clauses in different ways. In (4a), the bare plural *typhoons* contributes material to the restrictor clause and the predicate *arise in this part of the Pacific* contributes material to the matrix clause; whereas in (4b), the demonstrative *this part of the Pacific* contributes material to the restrictor and the predicate *arise in* and the bare plural *typhoons* contributes material to the matrix.

What does the quantificational approach say about the semantics of *Gen*? Many semantic analyses have been proposed for the *Gen* operator, with proposals involving conditional probabilities (Cohen, 1996, 1997, 1999a), modal conditionals (Asher and Morreau, 1995; Pelletier and Asher, 1997; Eckardt, 2000; Greenberg, 2003, 2007; Asher and Pelletier, 2013), default psychological generalisations (Leslie, 2007, 2008), quantification over ways of being normal (Nickel, 2009, 2016), and so on. Nevertheless, for the moment, we needn't say anything more specific about the semantic analysis for *Gen*. What matters is that the logical form of characterising sentences is treated as quantificational. The only relevant factors are that (i) characterising sentences are assigned tripartite logical forms and (ii) *Gen* is treated as a quantifier of some sort.

Contrastingly, according to the kind-predication approach, the logical form of generic sentences is a simple dyadic subject–predicate structure, roughly equivalent to the logical form of atomic sentences that predicate properties of individuals. On this view, bare plurals refer to kinds and the sentence predicates a property of that kind. Consequently, characterising sentences of the schema (5a) receive the logical form (5b) as in:

(5) a. Fs are G
b. G(F-kind)

Proponents of the kind-predication approach draw a strong analogy between sentences involving genuine reference to kinds like in (6a) and generic sentences like in (7a), arguing that they have essentially the same logical form:

(6) a. Dinosaurs are extinct.
b. extinct(dinosaur-kind)

(7) a. Tigers have stripes.
b. striped(tiger-kind)

The kind-predication view is motivated by a number of considerations. First, proponents of the kind-predication approach claim that the lack of any phonological or orthographical realisation of *Gen* in any know language and its semantical intractability counts significantly against its existence (Carlson, 1977a; Liebesman, 2011). This is explained under the kind-predication approach, since it does not posit any such operator. Second, proponents of the kind-predication approach seek to provide a uniform treatment of sentences involving genuine reference to kinds and characterising sentences by generalising the treatment of the former to the latter. For example, given the subject term of (6a) refers to a kind, they claim that, by parity of reasoning, the subject term in (7a) must also refer to a kind. Third, and relatedly, they claim that only the kind-predication approach can explain the semantics of generics involving complex copredications, like *Mosquitos are widespread and irritating*, which involve the co-occurrence of direct kind-predication and genericity (cf. Carlson, 1977a; Liebesman, 2011; Liebesman and Magidor, 2017, 2023).[5]

What does the kind-predication approach say about the nature of kinds and how they can be predicated properties usually reserved for first-order individuals? What is the nature of tiger-kind and how can it have the property of being striped when such properties seem to be satisfied only by first-order individuals like tigers? Proponents of the kind-predication approach sometimes claim that kinds are whatever are the referents of bare plural nouns and that providing an account of kind-predication is in the remit of metaphysics, not semantics (Liebesman, 2011, 418). Indeed, for present purposes, it is irrelevant what is the nature of kinds and whether kind-level predications reduce to quantificational facts about individual members of the kind. What matters is that the logical form of characterising sentences is treated as non-quantificational. The only relevant factors are that (i) characterising sentences are assigned bipartite, subject–predicate logical forms, (ii) bare plurals denote kinds typed as (perhaps, higher-order) individuals, and (iii) the characterising sentences are true iff the relevant kinds have the properties in question.

3. Generic Excluded Middle

Having laid out the quantificational and kind-predication approaches to generics, let us now turn to Generic Excluded Middle, repeated below for convenience.

Generic Excluded Middle (GEM): For any bare plural characterising sentence of the schematic form ⌜Fs are G⌝, the sentence ⌜Either Fs are G or Fs are not G⌝ is true.

Before we examine whether GEM is valid, let us unpack its content. For discursive lucidity, let us distinguish between the *opposite* of a generic and its *negation*, where for any generic of the form ⌜Fs are G⌝, its opposite is ⌜Fs are not G⌝ and its negation is ⌜It is not the case that Fs are G⌝. Negated generics should be conceptually distinguished from their unnegated opposites, at least in principle, since narrow-scope negation may not necessarily be reducible to wide-scope negation. The idea behind GEM, then, is that, for any bare plural generic, either it or its opposite is true.

Unfortunately, despite any intuitive appeal that GEM might enjoy, the principle is subject to systematic counterexamples as witnessed by the following sentences:

(8) a. Books are paperbacks or books are not paperbacks.
b. Fair coins land heads or fair coins do not land heads.
c. Lions are male or lions are not male.

A counterexample to GEM is a disjunction constituted by a characterising sentence and its opposite, neither of which are true. Observe, then, that sentence (8a) is a counterexample to GEM: on their generic readings, the sentences 'Books are paperbacks' and 'Books aren't paperbacks' aren't true, even though it is true that books are either paperbacks or not paperbacks. Similar remarks apply for the other examples. On their generic readings, the sentences 'Fair coins land heads', 'Fair coins don't land heads', 'Lions are male', and 'Lions are not male' aren't true, even though it is true that fair coins land either heads or tales and that lions are either male or not male. With sufficient ingenuity, such

5. For further discussion on generics and copredications, see Collins (2018).

counterexamples multiply without limit. Therefore, GEM is invalid.[6]

I shall now offer an argument against the kind-predication approach to generics, an argument that also supports the quantificational approach. Let us first consider whether the kind-predication approach predicts the invalidity of GEM. To answer this question, GEM should be reformulated to highlight the bipartite logical structure that the kind-predication approach assigns to generics:

Kind-Predication Generic Excluded Middle (K–GEM): For any generic sentence of the schematic form ⌜Fs are G⌝: ⌜G(F-kind) ∨ ¬G(F-kind)⌝ is true,

where '¬' and '∨' are the usual truth-functional connectives. Observe that, in K–GEM, the negation in the second disjunct (*Fs are not G*) is given wide-scope because the kind-predication approach does not postulate enough structure to distinguish between the logical forms of negated generics and their unnegated opposite counterparts. In other words, both (9a) and (9b) receive (9c) as their logical form:

(9) a. ⌜It is not the case that Fs are G⌝
b. ⌜Fs are not G⌝
c. ⌜¬G(F-kind)⌝

This should not be surprising, since the kind-predication approach treats bare plurals as individual-denoting terms and sentences headed by individual-denoting terms generally treat sentential and predicate negation equivalently, as evidenced in (10):

(10) a. It is not the case that John is happy.
b. John is not happy.
c. ¬happy(j)

An immediate upshot of the observation that the kind-predication approach does not distinguish between negated generics and their unnegated opposites is that, for the kind-predication approach, K–GEM is a special instance of the Law of Excluded Middle:

Law of Excluded Middle (LEM): For any sentence ϕ, ⌜ϕ or $\neg\phi$⌝ is true.

In other words, the kind-predication approach and LEM jointly entail K–GEM. According to the kind-predication approach, bare plural DPs like *tigers* refer directly to kinds which are themselves modelled as special types of first-order individuals (Liebesman, 2011). Given that LEM says that every first-order individual either satisfies a given predicate or it does not, it follows from this first-order treatment of kinds that they either satisfy a given predicate or they do not. For example, just as the individual name *Shere Khan* either satisfies the predicate *has stripes* or it does not, so too does the bare plural *tigers* either satisfies the predicate *has stripes* or it does not. More generally, if a kind term F either satisfies a predicate G or it does not, then either ⌜G(F-kind)⌝ is true or ⌜¬G(F-kind)⌝ is true. Consequently, the kind-predication view,

6. An anonymous reviewer raises a concern about whether some of the sentences in (8) really are counterexamples to GEM or whether they conflate falsity and unassertability. It is worth emphasising that the claim that the target sentences are false is not an idiosyncratic judgment, and that there is wide support in the literature for the claim that these disjuncts are false; see, for example, Carlson (1977a), Pelletier and Asher (1997, 1132) and Leslie (2008, 7). Nevertheless, some theorists take these sentences to be merely unacceptable, similar to cases of presupposition failure, rather than cases of falsity; see, e.g., Cohen (1999a, 228). Whether the sentences in (8) are false or merely unacceptable is a subtle question, but it does not need to be settled in order to take the sentences in (8) to establish the invalidity of GEM. The important point is that, *on their generic readings*, assertions of 'Books are paperbacks', 'Fair coins land heads', or 'Lions are male' (and their opposites) are not true. Furthermore, nothing in this paper rests on the claim that (8a–c) are false, rather than simply not true. (By way of analogy, it is instructive to consider what we should think about other cases of unassertability. For example, theorists who think that the sentence 'The present King of France is bald' is unassertable due to presupposition failure will nevertheless agree that the disjunction 'The present King of France is bald or the present King of France is not bald' is not true, albeit for the reason that its being true or false requires the existence of a unique king of France. Similarly, even those who judge the generics in (8) to be unassertable should agree that they are not true.) For further discussion of this point and the potential causes of infelicity or non-truth of the sentences in (8), see Sections 4 and 5.

in conjunction with LEM, entails K–GEM and thus GEM.[7]

On the other hand, the quantificational approach does not entail GEM, at least not as a matter of logical form. To see this, we must first again reformulated GEM to highlight the relevant tripartite structure that the quantificational approach assigns as the logical form of generics:[8]

Quantificational Generic Excluded Middle (Q–GEM): For any generic sentence of the schematic form ⌜*Fs are G*⌝: $\ulcorner \text{Gen}[\phi][\psi] \vee \text{Gen}[\phi][\neg\psi] \urcorner$ is true.

An immediate consequence of this reformulation is that, unlike the kind-predication approach, the quantificational approach and LEM do not jointly entail GEM. After all, the quantificational approach postulates enough structure to distinguish between the logical forms of negated generics and their unnegated opposite counterparts:

(11) a. ⌜It is not the case that Fs are G⌝
b. $\ulcorner \neg\text{Gen}[\phi][\psi] \urcorner$

(12) a. ⌜Fs are not G⌝
b. $\ulcorner \text{Gen}[\phi][\neg\psi] \urcorner$

Given that the quantificational approach can logically distinguish between these sentences, it does not follow that sentences of the form (11a) entail sentences of the form (12a), at least not as a matter of logical form. That is, for everything that we have said so far, neither $\ulcorner \text{Gen}[\phi][\psi] \urcorner$ nor $\ulcorner \text{Gen}[\phi][\neg\psi] \urcorner$ may be true. So long as the semantics for *Gen* does not collapse the distinction between (11b) and (12b), there is no conflict with LEM. Consequently, the quantificational approach does not immediately entail GEM.

7. For discussion of other versions of the kind-predication approach that also entail GEM, see von Fintel (1997, 31–2).
8. To remain neutral between competing versions of the quantificational approach, and different ways if dividing sentence material between the restrictor and matrix clauses, I simplify the LF representation by leaving tacit the variables bound by *Gen* and using ϕ, ψ as schematic metavariables ranging over the denotations of the restrictor and matrix clauses respectively.

To summarise the discussion, the fact that the kind-predication approach entails GEM is significant evidence that the approach is incorrect. For given LEM, if the kind-predication approach is correct, then the disjunction 'Books are paperbacks or books are not paperbacks' is true. But neither disjunct is true; neither 'Books are paperbacks' nor 'Books are not paperbacks' is true. Consequently, the original disjunction is not true, and so the kind-predication approach is incorrect. Furthermore, the fact that the quantificational approach does not immediately entail GEM is a significant advantage to its predictive power, since it avoids the unpalatable predication that sentences like those in (8) are true. Nevertheless, there may be specific semantic analyses of *Gen* that validate GEM. I shall examine such analyses in Section 5.

The question remains whether the kind-predication theorist has enough linguistic or metaphysical resources at her disposal to account for the invalidity of GEM. The following section will consider this question, arguing that either the kind-predication theorist must either embrace quantificational structure or else commit herself to some unpalatable metaphysical consequences.

4. Kind-Predication, Truth-Gaps, and Covert Material

In the previous section, I argued the simple kind-predication approach cannot account for the invalidity of GEM. However, the kind-predication theorist may respond to this argument either by (i) rejecting the Law of Excluded Middle, the principle upon which my argument relied, or by (ii) adopting additional covert material in the logical form of generics that allows them to distinguish between negated generics and their unnegated opposites. In this section, I shall consider and reject these responses.

4.1 Kind-Predication and Metaphysics

It may be tempting to resist the above argument by rejecting LEM. After all, if LEM is invalid, then not every individual must either satisfy a property *G* or not. Then there would be no reason to think every kind must either satisfy a given property or not. Consequently, rejecting LEM can reconcile the kind-predication approach with the invalidity of GEM. However rejecting LEM comes at a significant cost, namely, the rejection of standard classical logic. Given that classical logic and semantics are considered to be superior to its alternatives in terms of simplicity, power, and past success, it would be *ad hoc* to reject LEM to keep the kind-predication approach, at least without independent motivation.

There are at least two independently motivated strategies for rejecting LEM to which defenders of the kind-predication approach might appeal. First, one might argue that a generic is neither true nor false if the denotation of its subject term is undefined.[9] Then, if the counterexamples to GEM contain undefined bare plural DPs, they would be neither true nor false. This would allow the kind-predication approach to reject LEM as cases of presuppositional failure or failure of reference, while accepting a localised version of LEM that holds for every *defined* sentence of the language.

Is there any independent reason to think that bare plurals in characterising sentences are sometimes undefined? Some theorists have pointed out that not just any nominal constituent can form a kind-referring definite DP (Dahl, 1975; Carlson, 1977b). For example, the contrast in the acceptability of the following pair of sentences has been traced back to the existence of a "well-established kind" for Coke bottles, but not for green bottles:[10]

(13) a. The Coke bottle has a narrow neck.
     b. #The green bottle has a narrow neck.[11]

9. For other semantic theories that predict truth-value gaps arise from undefinedness, see the Frege–Strawson theory of definite descriptions which holds that sentences containing definite descriptions are truth-valueless when their definite descriptions are undefined due to presupposition failure (Heim and Kratzer, 1998; Elbourne, 2013).

10. An analysis of the notion "well-established kind" is not attempted here, since the distinction seems real enough given the strikingness of the example sentences.

11. '#' indicates infelicity of some sort.

If this point extends to bare plural DPs, then bare plural DPs that fail to refer to well-established kinds are undefined and sentences in which they are contained are neither true nor false. On this response, our truth-value judgments about counterexamples to GEM are mistaken. While we mistakenly judge the sentence 'Fair coins land heads or fair coins do not land heads' to be false, it is actually truth-valueless, since *fair coins* fails to refer to a well-established kind. As a result, not every instance of GEM (and, by extension, LEM) is true: the principle holds only of those generics whose DPs refer to "well-established kinds". Consequently, the kind-predication view does not entail GEM.

However, this strategy is inadequate for at least three reasons. First, the strategy will not work for all of the counterexamples to GEM. Some bare plural DPs in the counterexamples are not obvious candidates for reference failure, since it is highly plausible that they denote well-established kinds (if they denote kinds at all). For example, book-kind and lion-kind have as good a chance as any to satisfy "well-establishedness" in the intended sense. And we can truly assert generics involve the bare plurals *books* and *lions*, such as 'Books play a quintessential role in every student's life' and 'Lions have manes'. Consequently, generics like 'Books are paperback or books are not paperback' and 'Lions are male or lions are not male' are still counterexamples to GEM.

Second, the strategy incorrectly predicts truth-value judgments about the counterexamples to GEM. The counterexamples to GEM and their individual disjuncts are typically judged as False, not the 'squeamish' "I-don't-know" or 'Neither' commonly reported by LEM-deniers.[12] Consequently, it is highly doubtful that the counterexamples to GEM involve the presupposition failure or failure of reference that usually motivates these strategies for rejecting LEM.

Third, and more generally, the strategy inaccurately predicts that bare plural DPs must refer to well-established kinds for the charac-

12. Of course, this consideration will have less dialectical weight for theorists, like those mentioned in ft. 6, who judge the counterexamples to GEM to be merely unassertable, rather than false.

terising sentences in which they are contained to be felicitous. But, while characterising sentences containing definite DPs that supposedly refer to non-well-established kinds are infelicitous, their bare plural counterparts sound fine (Krifka et al., 1995, 11–12):

(14) a. #The green bottle has a narrow neck.
b. Green bottles have narrow necks.

Since bare plural DPs do not pattern with their definite DPs counterparts, there is little reason to think they only refer to well-established kinds. Moreover, many generics, whose DPs are gerrymandered and do not refer to anything well-established, are judged true. For example, the sentence 'Australian Tour de France winners are Australian' seems true, even though it is doubtful that Australian Tour de France winners is a well-established kind (cf. Dayal, 1992). Requiring that all generics involve "well-established" kinds limits our ability to explain why such generics are true. Given these reasons, the first strategy is inadequate for rejecting LEM.

Let us now turn to the second strategy for rejecting LEM. This strategy holds that the peculiarities of property inheritance allows for property gaps that, in turn, give rise to truth-value gaps. To see how this strategy works, recall that the kind-predication approach takes a kind to have an individual-level property just in case the kind inherits that property from its members. The idea, then, behind the second strategy is that kinds can fail to inherit certain properties (e.g., the property of being a G) from their members, while also failing to inherit the corresponding negative property (e.g., the property of not being a G). For example, one could argue that, even though fair coins are the kind of thing that can land heads, they do not instantiate this property to the extent that (or in a way in which) fair-coin-kind would inherit this property from its members. Similarly, even though fair coins are the kind of thing that might not land heads, they do not instantiate this property to the extent that (or in a way in which) fair-coin-kind would inherit the property of not landing heads from its members. If this is right, it seems plausible to say that it's not true that fair-coin-kind lands heads and it's not true that fair-coin-kind doesn't land heads. Then, neither (8b) nor the sentence 'Either fair-coin-kind lands heads or fair-coin-kind doesn't land heads' is true.[13] And similar remarks apply for lions and books. Consequently, proponents of this second strategy can explain why GEM isn't valid in terms of the invalidity of LEM.

The problem with this strategy is it hinges on a rather opaque notion of property inheritance. To properly evaluate this approach, one would hope for a developed account of how kinds inherit properties from their members, one that also explains how property inheritance gives rise to the right kinds of property gaps. Unfortunately, proponents of the kind-predication view are generally sceptical that any useful general principles governing the property inheritance relation can be provided. For example, Liebesman writes:

> Attempting to give a systematic account of the way in which material objects inherit properties from their parts is something of a fool's errand. The quantity and salience of the parts that is required for inheritance varies greatly. [...] The relationship between kinds and their members is similarly unsystematic. Generics ascribe properties to kinds and, given the multiplicity of properties and the multiplicity of ways kinds inherit properties from their members, no fully general account of inheritance will be forthcoming. (Liebesman, 2011, 420)

The lack of any concrete theory of property inheritance makes it difficult to properly evaluate this proposal, especially since there are numerous ways that proponents of the kind-predication approach can develop their account of inheritance. Nevertheless, I want to raise two general concerns about this strategy.

First, it's important just to appreciate how radical these kinds of property gaps are. According to this strategy, while fair-coin-kind

13. Recall that it is common ground amongst most, if not all, three-valued logics that a disjunction is neither true nor false if both its disjuncts are neither true nor false.

doesn't instantiate the property of landing heads, failing to instantiate that property is not enough for it not to be the case that fair-coin-kind lands heads. Furthermore, while fair-coin-kind doesn't instantiate the property of *not* landing heads, this is not enough for it not to be the case that fair-coin-kind doesn't land heads. But since every fair coin either lands heads or doesn't land heads, proponents of the kind-predication approach are committed to claim that fair-coin-kind *does* inherit the disjunctive property of either landing heads or not landing heads. Consequently, advocates of this strategy should be happy to assert sentences like the following:

(15) It is not the case that fair-coin-kind instantiates the property of landing heads, and it's not the case that fair-coin-kind instantiates the property of not landing heads, but it is the case that fair-coin-kind either lands heads or doesn't land heads.

Offhand, at least, such sentences sound highly contradictory. Proponents of the kind-predication approach must explain away the contradictory-soundness of such sentences, but it's not clear how they would do so.

The second problem arises because the property inheritance approach is committed to the idea that certain generics and their opposites express propositions neither of which are true or false, or, at the very least, that certain generics and their opposites express partial propositions, which can be understood as partial functions from worlds to truth-values.[14] To make this idea precise, let us first distinguish between the positive extension for a generic sentence S and its negative extension (call these $[\![S]\!]^+$ and $[\![S]\!]^-$, respectively) in such a way that failing to fall in a sentence's positive extension is consistent with failing to fall in a sentence's negative extension. Following Liebesman's quantificational glosses on the truth-conditions of 'Ravens are black', for example, we can state its positive and negative extensions in terms of an equivalence with the semantic content of 'Most ravens are black', as follows:[15]

(16) a. $[\![\text{Ravens are black}]\!]^+ \equiv_{\langle s,t\rangle} \{w : \text{most ravens are black in } w\}$
b. $[\![\text{Ravens are black}]\!]^- \equiv_{\langle s,t\rangle} \{w : \text{most ravens aren't black in } w\}$

where, '$\equiv_{\langle s,t\rangle}$' denotes a higher-order identity relation between propositions.[16] It should be clear from these equivalences that the positive and negative extensions of 'Ravens are black' aren't jointly exhaustive, that is, $[\![\text{Ravens are black}]\!]^+ \cup [\![\text{Ravens are black}]\!]^- \neq W$.

Next, let us specify the positive and negative extensions of the opposites of these generics analogously, as in (17).

(17) a. $[\![\text{Ravens aren't black}]\!]^+ \equiv_{\langle s,t\rangle} \{w : \text{most ravens aren't black in } w\}$
b. $[\![\text{Ravens aren't black}]\!]^- \equiv_{\langle s,t\rangle} \{w : \text{most ravens are black in } w\}$

Again, it should be clear from these equivalences that, given that the kind-predication approach identifies the negation of a generic with its opposite, the positive and negative extensions of the negation of a generic will be equivalent to the positive and negative extensions of its opposite, which, in turn, will be equivalent to the negative and positive extensions of the unnegated generic, respectively, as in (18):

(18) a. $[\![\neg(\text{Ravens are black})]\!]^+ \equiv_{\langle s,t\rangle} [\![\text{Ravens aren't black}]\!]^+ \equiv_{\langle s,t\rangle} [\![\text{Ravens are black}]\!]^-$
b. $[\![\neg(\text{Ravens aren't black})]\!]^+ \equiv_{\langle s,t\rangle} [\![\text{Ravens aren't black}]\!]^+ \equiv_{\langle s,t\rangle} [\![\text{Ravens are black}]\!]^-$

14. Here and throughout, I make the harmless idealisation assumption that the extensions of declarative English sentences can be modelled as (the characteristic functions of) sets of worlds.

15. Dialectically speaking, I think my use of quantificational glosses on the propositions expressed by generics is unobjectionable, since Liebesman helps himself to quantificational glosses on the truth-conditions of generics and argues at length that doing so doesn't commit him to the claim that generics are themselves quantificational; see Liebesman (2011, 420–421). The idea is meant to be that generics and their quantificational parses may be true in exactly the same circumstances, while nevertheless being semantically independent.

16. See Dorr (2016).

Thus, this strategy effectively abandons the idea that generic sentences and their negation determine an extension and an anti-extension that are mutually exclusive and jointly exhaustive with respect to the universe of discourse in the occasion of use. Furthermore, this abandonment percolates down to how the semantics treats the extension and anti-extension of predicate terms. These are treated in a non-standard way, so that the property denoted by the anti-extension of a predicate term is not simply the complement of its extension.

The problem with this suggestion is that it is difficult to maintain this kind of semantics alongside other commitments held by the kind-predication approach, while also providing a systematic treatment of negation that respects our intuitive truth-value judgements about certain classes of generics. Consider, for example, Liebesman's quantificational glosses for the truth-conditions for 'Mosquitos carry WNV' in (19) and its translation into the above notation in (20) (cf. Liebesman, 2011, 420–421):

(19) Mosquitos carry WNV $\leftrightarrow$ Some mosquitos carry the WNV

(20) $[\![\text{Mosquitos carry WNV}]\!]^{+} \equiv_{\langle s,t\rangle} [\![\text{Some mosquitos carry the WNV}]\!]^{+}$

Observe that the opposite, 'Mosquitos don't carry WNV', is intuitively false, but when we try to state its semantic content using the above notation and by applying the quantificational gloss from (19) in the natural way, we get the following equivalences:

(21) $[\![\text{Mosquitos don't carry WNV}]\!]^{+}$
$\equiv_{\langle s,t\rangle} [\![\text{Mosquitos carry WNV}]\!]^{-}$
$\equiv_{\langle s,t\rangle} \{w : \text{some mosquitos don't carry WNV in } w\}$

These truth-conditions are clearly inadequate: the sentence 'Mosquitos don't carry WNV' is intuitively false, even though the vast majority of mosquitos aren't WNV-carriers, but the above semantics predicts that it is true, since some mosquitos don't carry WNV.[17]

Alternatively, proponents of the kind-predication approach might make the *ad hoc* stipulation that the proposition expressed by 'Mosquitos don't carry WNV' *just is* the complement of the proposition expressed by 'Mosquitos carry WNV'. That is, the following equivalences hold:

(22) $[\![\text{Mosquitos don't carry WNV}]\!]^{+}$
$\equiv_{\langle s,t\rangle} W - [\![\text{Mosquitos carry WNV}]\!]^{+}$
$\equiv_{\langle s,t\rangle} [\![\neg(\text{Some mosquitos carry WMV})]\!]^{+}$

But, while this is empirically adequate, adopting this approach across the board threatens to collapse the distinction between positive and negative extensions that allow the kind-predication proponent to reject LEM in the first place. Furthermore, it requires negation to interact in generic sentences in an entirely unsystematic manner, taking different truth-conditional scope in different circumstances. The non-systematicity in the behaviour of negation would be a serious blow to the plausibility of this strategy.[18]

These brief remarks do not count decisively against the property inheritance approach. But I hope they serve to highlight some reasons

17. Even worse, this approach predicts that 'Mosquitos carry WNV' and 'Mosquitos don't carry WNV' are both true, and so it invalidates an extremely plausible principle governing generics, *Generic Non-Contradiction*:

Generic Non-Contradiction. For any bare plural characterising sentence of the form ⌜Fs are G⌝, ⌜Fs are G⌝ and ⌜Fs are not G⌝ cannot both be true.

See Hoeltje (2017, 114–116), for further discussion of Generic Non-Contradiction and its plausibility.

18. For other reasons to be cautious about theories that predict property gaps in this way, albeit in a different context, see Williamson (1994, §7.2), Glanzberg (2004), and Magidor (2013, 83–91).

to be cautious about adopting this approach.[19] The only grounds for rejecting LEM comes from rejecting the equivalence between the failure to inherit the property of being G and inheriting the property of being not-G. But rejecting this equivalence leads both to property gaps and to truth-value gaps. Any appeal to this strategy in explaining the data around GEM requires further details about how property inheritance works. As things stand, the metaphysical costs of rejecting LEM are too high.

4.2 Kind-Predication and Linguistics

The other option is that the kind-predication theorist might appeal to additional covert structure in the logical form of generic sentences already encoded in the syntax of generics (Carlson, 1977b; Chierchia, 1998; Teichman, 2023). There are a number of ways of implementing this idea. Some theorists admit the existence of a *monadic* generic operator *Gn* that is part of the verbal aspect of generic sentences (Chierchia, 1998); others argue that a covert predicate modifier shifts episodic or stage-level predicates like *smoke* to kind-level predicates suitable for predication to kinds (Teichman, 2023); and some argue that a generic quantifier is introduced by some pragmatic process of reinterpretation (Cohen, 2013). Despite these differences, each of these proposal are committed to the claim that generic sentences end up being assigned a tripartite, quantificational logical form.

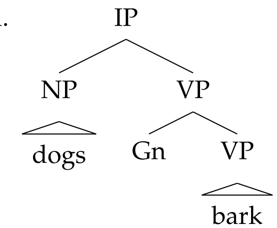
19. There are other reasons to be cautious about this notion of property inheritance. For example, kinds often seem to inherit some, but not other, properties from their members, even though exactly the same members instantiate both properties. For example, consider (i) seems true and (ii) to be true, even if all and only the male cardinals are the red ones.

(i) Cardinals are red.
(ii) Cardinals are male.

Explaining the difference in truth-value between these sentences is a general problem for theories of generics. But the present concern is that, while property inheritance is not guaranteed by a certain proposition of a kind's membership having a certain property, proponents of the kind predication approach do not offer an explanation for these facts.

Let us see how this works in practice. Following Chierchia (1998), the logical form of the generic *Dogs bark* is as follows:

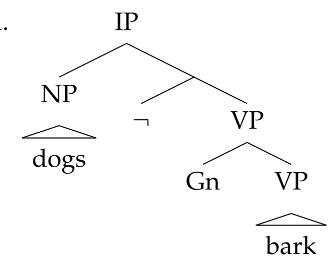
(23) a.



b. $\text{Gn } x,s[{}^{\cup\cap}\text{dog}(x) \wedge C(x,s)][\text{bark}(x,s)]$

where ${}^{\cup\cap}\text{dog} = \lambda x.\lambda s.dog(x,s)$, the result of typeshifting from dog-kind to denotation of the predicate *dog*, and C is a variable whose value is supplied by the context, restricting the domain of Gn to appropriate individuals and situations.[20] Once these quantificational, tripartite logical forms are admitted, it is clear how the kind-predication theorist now has the descriptive power to distinguish negated generics from their unnegated opposites:

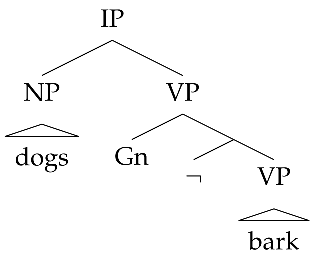
(24) a.



b. $\neg\text{Gn } x,s[{}^{\cup\cap}\text{dog}(x) \wedge C(x,s)][\text{bark}(x,s)]$

20. Alternatively, one may retain full commitment to the view *dogs* denotes a kind, and instead postulate that Gn denotes a function from verb phrases to a function from kinds to truth-values (or the intensional equivalent); compare Teichman (2023).

(25) a.



b. Gn $x, s[^{\cup\cap}\mathrm{dog}(x) \wedge C(x,s)][\neg\mathrm{bark}(x,s)]$

Furthermore, with this additional descriptive power, the sophisticated kind-predication theorist can agree that LEM is valid without admitting that GEM is valid for exactly the same reasons why the quantificational theorist can.

While I have no general in-principle objections to these sophisticated versions of the kind-predication approach, I should like to observe that these strategies essentially concede that the logical form of generic sentences is quantificational.[21] The role that covert material plays in these theories is to distinguish between negated generics and their unnegated opposites. And these theorists have postulated that the additional covert material is quantificational; indeed, it's not clear how else one can distinguish the scope of negation. So, if one endorses covert structure on the basis of the argument from the invalidity of GEM, then one is committed to endorsing something like the generic quantifier *Gen* as well. More generally, in this section, I have argued that the kind-predication theorist must admit the existence of something like *Gen* or commit herself to unpalatable metaphysical consequences, such truth-value or property gaps.

5. Further Reflections on the Quantificational Approach

In Section 3, I argued that the quantificational approach does not entail GEM as a matter of logical form, but specific semantic analyses of *Gen* may end up validating GEM. In this section, I begin by demonstrating that some semantic analyses of *Gen* straightforwardly invalidate GEM, while others must posit additional principles and constraints to invalidate it (§5.1). I then argue that other semantic analyses of *Gen* straightforwardly validate GEM, and so, they should be rejected (§5.2).

21. For arguments against Cohen (2013), see Sterken (2016).

5.1 Invalidating GEM

To see how the quantificational approach to generics can invalidate GEM, we must consider how specific semantic analyses of *Gen* handle GEM. While numerous versions of the quantificational approach have been proposed, I will focus on two specific semantic analyses of *Gen* – the normality-based view and the probability-based view – and argue that they both avoid validating GEM. An exhaustive survey of different semantic analyses of generics is outside the scope of this paper. But I hope that my remarks here will illustrate how to check whether theories validate GEM. In particular, the central observation I wish to stress is that one's semantics mustn't collapse the truth-conditional distinction between negated generics and their (unnegated opposites), on pain of validitating GEM.

Normality-based accounts typically deploy (restricted) universal quantification over normal individuals or normal worlds. For example, according to Yael Greenberg's (2003; 2007), a generic of the form ⌜*Fs are G*⌝ is true iff, roughly speaking, in all appropriately accessible worlds, every contextually relevant and normal F-individual has the G-property in those worlds.[22] More formally, Greenberg proposes that generics of the form ⌜*Fs are G*⌝ have the following truth-conditions:

(26) $\forall w'(w'$ is appropriately accessible from $w_0 \rightarrow \forall x[P^{\text{cont.norm}}(x, w')$ $\rightarrow Q(x, w')])$,

22. For present purposes, I will focus on Greenberg's theory, but what I have to say generalises to other versions of the view. For other proponents of the normality-based approach, see, e.g., Asher and Morreau (1991, 1995); Krifka et al. (1995); Pelletier and Asher (1997); Eckardt (2000); Asher and Pelletier (2013).

where 'w_0' is the actual world, 'P' and 'Q' are the subject and VP properties, respectively, and the superscript 'cont.norm' is a restriction on P to the contextually relevant and normal P-individuals.

Contrastingly, probability-based versions of the orthodoxy typically deploy universal or majority-based quantification over all suitable smoothed out admissible temporal segments of possible worlds that extrapolate from the current history so far. For example, Cohen (1996, 1997, 1999a) proposes that a generic of the form ⌜Fs are G⌝ is, roughly speaking, true iff the probability of an arbitrary F's being G is greater than 0.5, where *an F's being G* is understood in terms of conditional probability. More formally, Cohen (1999a, 37) proposes the following truth-conditions:[23]

(27) *Cohen's semantics, first version*
Let ⌜$\text{Gen}[\psi][\phi]$⌝ be a sentence, where ψ and ϕ are properties.
Let $A = \textsc{alt}(\phi)$, the set of alternatives to ϕ. Then
⌜$\text{Gen}[\psi][\phi]$⌝ is true iff $P(\phi|\psi \wedge \bigvee A) > 0.5$

where P is a frequentist probability function. These relative probability judgments are interpreted in a Branching Time framework (Thomason, 1984), where we consider not only the sequence of events that we have actually observed, but also possible continuations of that sequence into the future. Given frequentism, this amounts to the claim that the frequency of ϕs in a suitable reference class of ψ's that also satisfy one of the alternatives associated with ϕ is greater than 0.5.

To see how these theories work, consider the truth-conditions that that they assign to (1a), repeated below as (28) with a LF as in (28a):

(28) (= (1a)) Ravens are black.

a. Gen x[raven(x)][black(x)]

23. Actually, Cohen proposes a slightly more complicated truth-conditions in order to accommodate what he calls 'relative generics'. We will focus on a simplified version of his view, since nothing that I have to say here is impacted by relative generics.

(29) (28a) is true iff $\forall w'[w'$ is appropriately accessible from $w_0 \rightarrow \forall x(\text{raven}^{\text{cont.norm}}(x, w') \rightarrow \text{black}(x, w'))]$

(30) (28a) is true iff $P(\text{black}(a)|\text{raven}(a)) > 0.5$

Both of these analyses are empirically adequate with respect to (28). On Greenberg's theory, (28a) is true iff, in all appropriately accessible worlds, every contextually relevant and normal raven is black in those worlds. And on Cohen's theory, (28a) is true iff the probability of an arbitrary raven's being black is greater than 0.5.

But how do these accounts fare with our counterexamples to GEM? Consider, again, the sentences in (8), repeated below as (31).

(31) a. (=(8a)) Books are paperbacks or books are not paperbacks.
b. (=(8b)) Fair coins land heads or fair coins do not land heads.
c. (=(8c)) Lions are male or lions are not male.

Greenberg's account clearly and correctly predicts that (8a) is false. For, according to her theory, the first disjunct 'Books are paperbacks' is true just in case, roughly speaking, in all appropriately accessible worlds, every contextually relevant and normal book is paperbacked in those worlds. Similarly, the second disjunct, 'Books are not paperbacks', is true just in case in all appropriately accessible worlds, every contextually relevant and normal book is not paperbacked in those worlds. But since only some of those books are paperbacks in those worlds, and the others are hardbacks, neither disjunct is true, and so the disjunction is false overall. These remarks generalise to (8b) and (8c); Greenberg's theory predicts they are false for analogous reasons. And, abstracting away from the specifics of Greenberg's theory, we can observe that any theory involving universal quantification over (perhaps suitably restricted) normal individuals or worlds can, in principle, avoid validating GEM, since there is no guarantee that either a universal generalisation nor its opposite is true.

Matters are more complicated on Cohen's account. It is clear that Cohen's semantics predicts that (8b) is false. For both disjuncts are false on Cohen's semantics: the first disjunct 'Fair coins land heads' is false, since $P(\text{land.heads}(a)|\text{fair.coin}(a)) = 0.5$, as is the second disjunct 'Fair coins don't land heads', since $P(\text{land.heads}(a)'|\text{fair.coin}(a)) = 0.5$, where $P(A')$ is the probability of 'not A'.[24]

But things are trickier for (8a) and (8c). As I have stated Cohen's semantics in (27), it predicts that these disjunctions are true, since the vast majority of books are paperbacks and most lions are female. This is clearly the wrong result. But, in part to account for these kinds of sentences, Cohen proposes that a generic $\ulcorner \text{Gen}[\psi][\phi] \urcorner$ is homogeneous in the following sense:[25]

(32) **Homogeneity (Cohen).** A reference class ψ is homogeneous with respect to a property ϕ, iff there is no *suitable* set of properties Ω such that:

1. Ω induces a partition on ψ, i.e., $\forall x : \psi(x) \to \exists! \omega \in \Omega : \omega(x)$.
2. $\exists \omega \in \Omega : P(\phi|\psi \wedge \omega) \neq P(\phi|\psi)$.

In words, a reference class ψ is homogeneous iff there is no suitable partitioning of it such that the probability of ϕ given one of the subsets of ψ induced by the partition is different from the probability of ϕ given ψ as a whole.

Cohen then hardwires the requirement that generics are homogeneous directly into his truth-conditions, as we can see in the following, simplified revision of (27):[26,27]

(33) *Cohen's semantics, revised*
Let $\ulcorner \text{Gen}[\psi][\phi] \urcorner$ be a sentence, where ψ and ϕ are properties.
Let $A = \text{ALT}(\phi)$, the set of alternatives to ϕ. Then
$\ulcorner \text{Gen}[\psi][\phi] \urcorner$ is true iff for every Ω, a salient partition of ψ, and for every $\omega \in \Omega$, $P(\phi|\psi \wedge \omega \wedge \bigvee A) > 0.5$

What exactly counts as a "salient" partition? Cohen (1999a,b, 2004) argues that this will depend on the domain of the generic and the predicated property, as well as how we cognitively represent the corresponding concepts. For example, the concept *book* may be represented as dividing into genres, such as *encyclopaedia*, *mystery*, *romance*, and so on. Now consider the following sentence:

(34) Books are paperbacks.

Assuming that the concept *book* is represented in the manner just described, we may ask whether the domain is homogeneous with respect to the property of being paperback. The answer is no, since some genres of books like encyclopaedias are typically hardbacks. But then, there is some partition Ω over the property of being a book according to genre, such that there is some genre $\omega \in \Omega$, such that $P(\phi|\psi \wedge \omega \wedge \bigvee A) < 0.5$ (where ψ, ϕ be the properties of being a book and being paperbacked, respectively). Consequently, the homogeneity requirement is not satisfied, and so (34) is false. The same observation also applies to its opposite, 'Books are not paperbacks'; since most genres of books are typically paperbacks, there is some genre $\omega \in \Omega$, say, *romance*, such that $P(\phi'|\psi \wedge \omega \wedge \bigvee A) < 0.5$. Thus, 'Books are not paperbacks' is false.

24. A wrinkle. It is physically possible, though exceedingly rare, for a flipped fair coin to land on its side. Taking this into account, $P(\text{land.heads}(a)|\text{fair.coin}(a)) < 0.5$, and so $P(\text{land.heads}(a)'|\text{fair.coin}(a)) > 0.5$. It may be that Cohen's homogeneity principle (or the proper interpretation of the probability operator) can save Cohen's semantics from this wrinkle, but if not, his semantics has the disastrous consequence that 'Fair coins don't land heads' is true.
25. For further discussion of Cohen's homogeneity principle, see Cohen (1999a, 235ff.).
26. Cohen's actual statement of his truth-conditions is complicated by (i) his treatment of relative generics (see ft. 23) and (ii) his treatment of alternatives. For present purposes, I assume a simplified treatment of alternatives, though, see Cohen (1999b, 82–3; Chapter 5), for further discussion.
27. Interestingly, Cohen (2004) proposes a different, non-equivalent homogeneity constraint, which he treats as a presupposition of generics, rather than an entailment of his semantics. See ft. 30, for further discussion of this proposal.

Thus, Cohen's account correctly predicts that (8a) is false.

Similar remarks apply to (8c). While the majority of lions are female, if we partition the domain of lions according to sex, there will be a subclass of lions that are not male – the female lions – and there will be a subclass of lions that are not not male – the male lions. The existence of these subclasses means that the homogeneity requirement is not satisfied for both 'Lions are male' and 'Lions are female', and so both of these sentence are false. Thus, Cohen's account predicts that (8c) is false. Thus, Cohen's account avoids validating GEM.

5.2 *Validating GEM*

In the previous subsection, we observed a distinction between those theories of generics that invalidate GEM as a straightforward consequence of their semantics, such as Greenberg's, and those theories of generics that require additional assumptions to invalidate GEM, such as Cohen's semantics and his homogeneity constraint. In this subsection, I want to demonstrate how specific semantic and metaphysical assumptions about the nature of *Gen* can lead to quantificational approaches validating GEM.

5.2.1 *Von Fintel (1997)*

Von Fintel (1997) presents a compositional semantics for sentences like *Only mammals give live birth*. In order to make his theory empirically adequate, von Fintel argues that generics validate GEM. He beings with a long-standing observation that definite plurals and generic bare plurals seem to carry an 'all-or-nothing' presupposition (Fodor, 1970, 159–67). For example, the sentence 'The children are asleep' seems to presuppose that either all or none of the children are asleep, and asserts that all of them are asleep. For example, the sentence 'Ravens are black' seems to presuppose that either all or no contextually salient ravens are black, and asserted that all such ravens are black. Von Fintel takes this to be evidence that the *Gen* operator is lexically specified to trigger a presupposition of homogeneity:[28]

(35) **Homogeneity (von Fintel).** $\ulcorner \text{Gen}[\phi][\psi] \urcorner$ is defined only if:
$\ulcorner (\forall x \in D : \phi(x) \rightarrow \psi(x)) \vee (\forall x \in D : \phi(x) \rightarrow \neg\psi(x)) \urcorner$
where D is some suitable domain of individuals.

Given Homogeneity, it directly follows that $\ulcorner \text{Gen}[\phi][\psi] \urcorner$ is false iff $\ulcorner \text{Gen}[\phi][\neg\psi] \urcorner$ is true, or shorter:

(36) $\ulcorner \neg\text{Gen}[\phi][\psi] \urcorner$ iff $\ulcorner \text{Gen}[\phi][\neg\psi] \urcorner$

Given (36), LEM, and the substitution of material equivalences, GEM immediately follows. Given LEM, $\ulcorner \text{Gen}[\phi][\psi] \vee \neg\text{Gen}[\phi][\psi] \urcorner$. Then, given (36), $\ulcorner \text{Gen}[\phi][\neg\psi] \urcorner$ can be substituted for $\ulcorner \neg\text{Gen}[\phi][\psi] \urcorner$ to get Q–GEM: $\ulcorner \text{Gen}[\phi][\psi] \vee \text{Gen}[\phi][\neg\psi] \urcorner$. Consequently, if the *Gen* operator triggers the homogeneity presupposition, then the quantificational approach validates GEM.

However, there is reason to doubt that the *Gen* operator triggers the homogeneity presupposition, since it fails standard tests for determining whether a sentence generates a presupposition (Kirkpatrick, 2015, 2019; Križ, 2015). First, generic sentences fail the 'Hey, wait a minute' (HWM) test proposed by von Fintel (2004b). According to the HWM test, a complaint is legitimate when it is about a presupposition of an utterance that is not established fact prior to that utterance, but not when it is about an asserted, non-presuppositional component of the utterance. Consider (37):

(37) A: Has Elmo stopped smoking?
B: Hey, wait a minute! I had no idea Elmo used to smoke.
C: #Hey, wait a minute! I had no idea that Elmo stopped smoking.

B's complaint to the presuppositional component of A's utterance is felicitous, but C's complaint to the asserted, non-presuppositional component is infelicitous. Consequently, the claim that Elmo used to smoke is a presupposition, whereas the claim that Elmo stopped smoking is not.

If characterising sentences trigger presuppositions that either all or no individual in a certain domain satisfied the predicate, then we would

28. See also Löbner (1985); Barker (1996); Yoon (1996).

expect that C's complaint to A's utterance would be felicitous. But this is clearly not the case.

(38) A: Are cats black?
B: Hey, wait a minute! I had no idea that cats could be black.
C: #Hey, wait a minute! I had no idea that either all or no normally coloured cats had to be black.[29]

While B's complaint to a clearly presuppositional component of A's utterance is felicitous, C's complaint is not. Consequently, characterising sentences fail the HWM test.

Second, generic sentences fail projection tests for presuppositions. It is well-known that presuppositions project from questions, as evidenced by the fact that the question in (37) commits the speaker to the belief that Elmo used to smoke. If characterising sentences trigger homogeneity presuppositions, the question in (38) would commit A to the belief that either all or no normally coloured cats are black. But this is not the case. The question of whether cats are black is compatible with normally coloured cats being coloured in a variety of ways — normally coloured cats may be brown, ginger, white, black, or any mixture of the four.

Furthermore, it is well-known that presuppositions project from the antecedent of a conditional. For example, (39) presupposes that Elmo used to smoke:

(39) If Elmo stopped smoking, then he's probably feeling jittery.

If characterising sentences triggered homogeneity presuppositions, then (40) should entail that either all or no normally coloured cats are black. But this is clearly not the case:

(40) If cats are black, then we better be careful crossing paths with cats.

Since passing the HWM and projection tests are plausible necessary conditions for the existence of presuppositions, this is strong evidence that the *Gen* operator is not lexically specified to trigger the Homogeneity Presupposition. Consequently, von Fintel's homogeneity argument for GEM fails.[30,31]

5.2.2 *Nickel (2009, 2010, 2016)*

To conclude this section, I want to focus on Bernhard Nickel's (2009; 2016) theory of generics, an important theory which I think is worth serious consideration.

According to Nickel's theory, the generic operator *Gen* is, roughly speaking, an existential quantifier over ways of being normal, rather than a universal quantifier over normal individuals or worlds or a majority-based probability operator. More specifically, Nickel proposes the following truth-conditions:

(41) $\ulcorner$*Fs are G*$\urcorner$ are true at a context *c* iff there is a way *w* of being a normal *F* that is salient in *c*, and all *Fs* that are normal in way *w* are

29. For the sake of argument, I follow von Fintel in assuming that, for a generic $\ulcorner$Fs are G$\urcorner$, *Gen* quantifiers over the *G*-normal *Fs*; my arguments apply to any variation on the contextual restriction.

30. As mentioned in ft. 27, Cohen (2004) proposes that generics *presuppose* their domain is homogenous in the following sense:

(i) The generic [$\ulcorner$Gen[ψ][ϕ]$\urcorner$] presupposes that exactly one of the following holds:

1. for every psychologically salient partition Ω on ψ, and for every $\psi' \in \Omega$, $P(\phi|\psi')$ is high,
2. for every psychologically salient partition Ω on ψ, and for every $\psi' \in \Omega$, $P(\phi|\psi')$ is low. (Cohen, 2004, 531)

On a natural understanding of this view, a generic $\ulcorner$Gen[ψ][ϕ]$\urcorner$ is true, if for every psychologically salient partition Ω on ψ, and for every $\psi' \in \Omega$, $P(\phi|\psi') > 0.5$; the generic is false, if for every psychologically salient partition Ω on ψ, and for every $\psi' \in \Omega$, $P(\phi|\psi') < 0.5$; otherwise, it is undefined. Consequently, it should be clear Cohen's 2004 is not equivalent to his earlier 1999a; 1999b theory. Furthermore, Cohen's 2004 implementation of homogeneity validates GEM for broadly similar reasons to von Fintel's. Consequently, I think this proposal should be rejected, although I want to stress that most of his paper remains untouched by this objection.

31. It's unclear whether von Fintel must assume that Homogeneity is a presupposition for his theory of *only*-sentences (cf. von Fintel, 1997, 35). For example, Krifka (1996) treats homogeneity as a kind of pragmatic strengthening, rather than a presupposition. This approach accommodates our favourable intuitions towards GEM without validating it.

G.

To see how Nickel's theory works, consider the truth-conditions it gives for (1a) (= 'Ravens are black'):

(42) The sentence 'Ravens are black' is true at a context *c* iff there is a way *w* of being a normal raven in context *c*, and every raven that is normal in way *w* is black.

On the assumption that the context makes salient normal ways of being coloured, the truth-conditions for (1a) is empirically adequate.

However, a complication for Nickel's theory arises with negated generics like (43) (cf. Nickel, 2016, 127ff.):

(43) Ravens are not white.

Intuitively, (43) denies that normal ravens are white. But this is not predicted by Nickel's semantics. The negation in (43) can either be interpreted as taking wide-scoping over the whole sentence or as taking narrow-scope over the verb phrase. Applying Nickel's semantics to these interpretations yields the truth-conditions in (44) and (45), respectively:

(44) It's not the case that there is a way of being a normally coloured raven such that every raven that is normal in this way is white.

a. All ways of being a normally coloured raven are such that, for each of these ways, there is some raven that isn't white.

(45) There is a way of being a normally coloured raven such that every raven that is normal in this way is not white.

By pushing the negation in (44) through the quantifiers, we see that it is equivalent to (44a), which does not capture the intuitive meaning of (43), as it is compatible with normally-coloured white ravens. And (45) isn't right either, since it only rules out that the possibility that white is the *only* normal colour for ravens.

In order to capture the intuitive reading of negated generics like (43), Nickel requires that his semantics validates the following homogeneity principle:[32]

(46) **Homogeneity (Nickel).** If this is true:

> All ways *w* of being an *F*-normal *A* are such that, for each *w*, there is an *A* that is *w* but that is not *F*.

Then this is true:

> All ways of being an *F*-normal *A* are such that, for each *w*, all *A*s that are *w* are not *F*. (Nickel, 2016, 129)

Given Nickel's homogeneity principle, (44a) entails (47):

(47) All ways of being a normally coloured raven are such that, for each of these ways, all ravens that are normal in that way are non-white.

This is exactly what is needed to capture the intuitive meaning of (43).

However, the problem with Nickel's homogeneity principle is that, together with his semantics and LEM, it entails that Generic Excluded Middle. To see this, consider an arbitrary instance of LEM:

(48) ⌜Fs are G $\vee \neg$(Fs are G)⌝.

I will now show that, regardless of which disjunct is true, GEM follows. This is straightforward when the first disjunct is true. For suppose ⌜Fs are G⌝ is true; then, by disjunction introduction, ⌜Fs are G $\vee$ Fs are not G⌝.

To show that the second disjunct also entails GEM, suppose ⌜$\neg$(Fs are G)⌝ is true. Then, by applying Nickel's semantics and pushing the negation through the quantifiers, we get:

32. Numerous places in Nickel's informal remarks strongly suggest he intends his homogeneity principle to be an entitlement, such as the following: "The principle to enforce the sort of homogeneity I just described informally is simply the inference from claims of the form instantiated by [(44a)] to claims of the form instantiated by [(47)] are *always valid*" (Nickel, 2016, 129; my *emphasis*); see also Nickel (2010, 489ff.).

(49) All ways of being a G-normal F are such that, for each w, there is some F that is w and not-G.

By applying Nickel's homogeneity principle to (49), it follows that:

(50) All ways of being a G-normal F are such that, for each w, all Fs that are w are not-G.

That is, there is no way w of being a G-normal F such that every F that is w is G. So, by Nickel's semantics, (51) is not true:

(51) ⌜Fs are G⌝.

Now, since every F is necessarily either a G or not a G, every instance of (52) should be a theorem on any theory of generics:[33]

(52) ⌜Fs are G or not-G⌝.

Applying Nickel's semantics, it follows that (52) is true only if:

(53) There is a way of being a G-normal F (call it w^*) such that every F that is normal in way w^* is either G or not-G.

But, from (50), we have it that *every* way of being a G-normal F is such that, for each w, all Fs that are w are not-G. So, it follows that w^* is a G-normal way of being an F such that every F that is w^* is not-G. In other words, by disjunctive syllogism, it follows from (50) and (53) that:

(54) ⌜Fs are not-G⌝.

And, finally, by disjunction-introduction, ⌜Fs are G $\vee$ Fs are not G⌝ is true. So, regardless of whether ⌜Fs are G⌝ or ⌜$\neg$(Fs are G)⌝ is true, ⌜Fs are G $\vee$ Fs are not G⌝ is true.[34] Thus Nickel's theory, together with some extremely plausible and independently motivated principles, entails GEM. This result is devastating for Nickel's theory.

33. Note the relevant reading of (52) involves a disjunctive matrix clause, rather than as a disjunction of generics. That is, the logical form of (52) is ⌜$\mathrm{Gen}[\phi][\psi \vee \neg\psi]$⌝, rather than an instance of GEM.

34. For a related argument that Nickel's view contradicts *Generic Non-Contradiction* – that is, the principle according to which all sentences of the form ⌜$\neg$(Fs are G $\wedge$ Fs are not-G)⌝ are valid – see Hoeltje (2017, pp. 114–116).

6. Concluding Remarks

The main lesson of this paper concerns the semantics of generics: any adequate theory of generics must predict that GEM is invalid. This observation is particularly important when deciding between kind-predication and quantificational approaches to the semantics of characterising sentences. If the arguments in this paper are correct, the kind-predication approach entails GEM and so it is false. On the other hand, the quantificational approach fares much better. No general argument that the quantificational approach entails GEM is forthcoming and some prominent semantic analyses for *Gen* are shown not to entail GEM. Nevertheless, careful attention must be paid to whether particular semantic analyses of *Gen* entail GEM. As we have seen, some semantics for *Gen* do entail GEM, and so they too should be rejected. Investigating whether a particular semantics entails GEM is thus a useful test for whether that analysis is true.[35]

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